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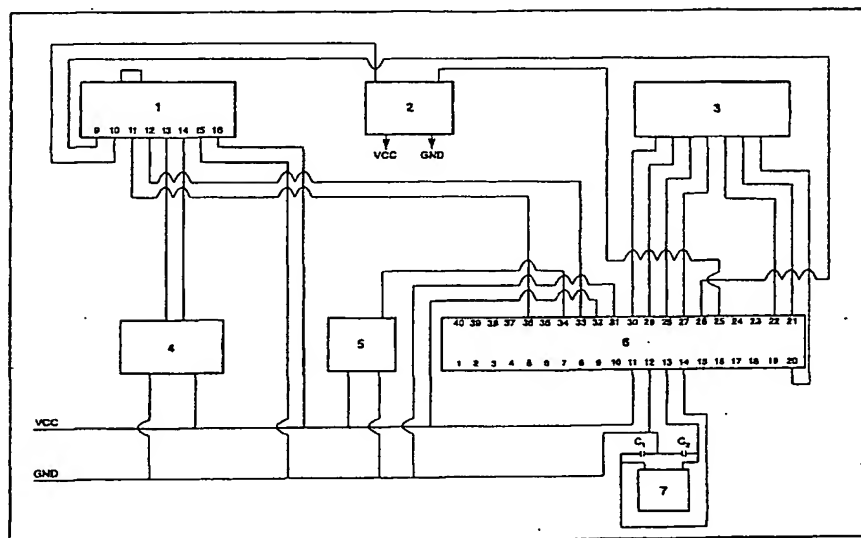
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TRANSMISSION UNIT AND ITS APPLICATION IN ADDITIONAL CREDITING OF SIM CARDS FOR MOBILE TELEPHONES



(57) Abstract: The present invention resolves the problem of designing the unit and the concept of its application, whereby simple, fast and safe additional crediting of SIM cards for mobile telephones is realized in all areas covered with the GSM network or fixed telephony. This is achieved so that the unit per the present invention is composed of communications chip (1), GSM module (2), keyboard (3), mini printer (4), LCD display (5), micro controller (6) and 20MHz oscillator (7), which are design connected so that through the application of the unit they allow the procedure of additional crediting of SIM cards to be performed per the concept set out in the present application.

WO 03/100736 A1

TRANSMISSION UNIT AND ITS APPLICATION IN ADDITIONAL CREDITING OF SIM CARDS FOR MOBILE TELEPHONES

THE AREA OF TECHNIQUES THE INVENTION RELATES TO

The area of techniques the invention relates to is, generally taken, the area of electronics, and it relates specifically to complex electronic systems allowing electronic payments and non-cash money transactions by way of the fixed or mobile telephony.

According to the international classification of patents (MPK, Intl⁵), the subject of this invention is classified and designated with the basic classification symbol G0F19/00, relating to devices actuated by coded cards adapted for issuing or receiving money, and similar, and for delivery of information on such operations to the existing accounts.

Since a coded protection information is used in the unit per this invention, the invention can be designated also with the secondary classification symbol G07F07/10 defining units using objects different from money for actuating systems for sale, lease, and issuing, at simultaneous use of coded signals.

TECHNICAL PROBLEM

The technical problem resolved by the present invention consists in the following: How to design a unit and define the concept of its application so that it can be used for simple, fast and safe additional crediting of SIM cards, with the unit being reliable in operation, of small dimensions, and allowing at the same time additional crediting in all regions covered with the GSM network or fixed telephony.

STATE OF THE ART

According to the present state of the technique, additional crediting of SIM cards (digital cards recording data on the subscriber, that can be of ISO format or micro format) is performed in the usual way by buying cards for additional crediting at one of the selling points of the mobile telephony operator. Such additional crediting cards are of standard manufacture and are sold in different denominations. The very procedure of additional crediting develops by performing certain procedures in a determine sequence, indicated most frequently in the form of instructions on the additional crediting card, and consisting in the following:

- Upon purchasing the additional crediting card, the mobile telephone owner scratches the safety strip and reveals the secrete code;
- He calls from his mobile telephone the phone number of the mobile telephony operator to effect the additional crediting;
- He follows the instructions of the voice automate relating to the entering of the secrete code and the procedure of loading the SIM card;
- Upon completed procedure of loading and confirmation by the mobile telephone owner that the procedure has been properly accomplished, the SIM card is additionally credited by the value of the additional crediting card.

Although in mass use over a longer period, this method of additional crediting of SIM cards has a number of deficiencies reflecting in the following:

- Permanent queuing in lines, which means waiting and loosing time, in order to purchase the additional crediting card at stationary selling points;
- Conditions of manufacture and distribution of additional crediting cards to the selling points;
- Increasingly frequent mistakes in secrete codes during the manufacture of cards, because of which there is a number of unusable additional crediting cards in sale, resulting in unpleasant, conflicting situations between the sellers of these cards and owners of mobile telephones;
- The amount of additional crediting of SIM cards is limited by the denominated values of these cards;
- In the case of less mobile or immobile owners of mobile telephones, the purchase of additional crediting cards for them must be performed by a mediator or some other person;
- Recently, forged additional crediting cards also appeared on the market, and these represent a difficult problem in this area.

Because of the all above indicated, it is surprising that in the literature relating to the area of telephony, which is extremely present and in permanent expansion, when operational efficiency of additional crediting of SIM cards is in question, there are no attempts to find out the ways of

making it more rational, and there is even almost no information on attempts to overcome this problem.

In the international application of patent P-208/02, the author, Dejan Dragojlovi}, requested protection for the invention named "Unit for non-cash transfer of money funds by way of the GSM network" describing and presenting in a drawing the unit ensuring electronic transfer of money by using the mobile telephone, having in mind the possibilities of the mobile telephony, and especially its spreading. In this way, by means of POS terminals, efficient substitution of the so far used method of payment for goods and services with cash, checks, credit cards, and similar, has been achieved by the fast and safe electronic transfer of money. Such unit is featured by simple operation, automation and use of PIN code (the number for identification of participants in a transaction, which can have 4 to 8 digits), and by maximum safety.

Motivated exactly by this technical solution of his, and not satisfied with the known and in practice already applied method of additional crediting of SIM cards, due to the above mentioned deficiencies, the author decided in favor of a new design of the unit and its application eliminating the deficiencies of the conventional additional crediting of SIM cards.

In spite of careful search of the accessible Yugoslav and foreign patent documentation, the inventor has not found a similar unit or a similar way of using some other unit that would be relevant to the present invention.

EXPLANATION OF THE ESSENCE OF THE INVENTION

The newly designed unit and the method of its application, according to the present invention, have resolved the afore-defined technical problem.

The essence of the invention reflects in that a micro-controller, a communications chip for providing the level of integrated signals of 0, +5V, a GSM module, a keyboard, a mini printer, an LCD display and a 20MHz oscillator are fitted in a light, portable housing. In order to demonstrate its feasibility, the example of the implementation of the invention indicates the components of which the unit is composed, which are of standard manufacture, well known in the state of the art, and which individually are not the subjects of patent protection. The novelty of the invention, however, represents their design connection allowing the procedure of additional crediting of SIM cards to be effected efficiently and in the most favorable way, i.e. in places and in amounts corresponding completely to a number of mobile telephone owners.

The novelty of the invention represents also the method of using such a unit through an authorized mobile operator handling the unit and allowing the additional crediting of SIM cards to be performed on the spot where the mobile telephone owner is located at that point of time, with the additional crediting compensated for by one of the known payment methods (by check, credit card or cash). If the mobile telephone owner has an account open with a business bank having established business and technical cooperation with the network of units according to the present invention, the additional crediting of SIM cards can be performed in an even more simple way by way of the electronic payment method.

The transmission unit and its application for additional crediting of SIM cards for mobile telephones according to the present invention has several advantages over the conventional, known methods of additional crediting, the most important of which are as follows:

- Costs of manufacturing the additional crediting cards are avoided;
- Mistakes appearing due to faulty cards are avoided, and the possibility of using forged additional charging cards is eliminated;
- A complete program and logistic support for financial transactions at continuous automatic processing and storing of all data is achieved with this transmission unit;
- Considerable saving of time available to mobile telephone owners by avoiding queuing and going to selling points;

Possibility for people in hospitals and other health institutions, as well as for less mobile and immobile persons to perform alone and directly the additional crediting of SIM cards for their mobile telephones.

OUTLINE DESCRIPTION OF FIGURES AND DRAWINGS

For the purpose of better understanding the invention, and in order to show how it can be realized in practice, the author refers, for the sake of just an example, to the enclosed drawing relating to the present patent application, where:

- Fig. 1 shows the functional diagram of the transmission unit for additional crediting of SIM cards for mobile telephones;

- Fig. 2 represents a simplified schematic presentation of the application of the unit per the invention in the procedure of additional crediting of SIM cards.

DETAILED DESCRIPTION OF THE INVENTION

As can be seen from Fig. 1 of the enclosed drawing, the transmission unit for additional crediting of SIM cards is composed of communications chip 1 (ST 232 CN) ensuring the level of generated signals (0, +5V), GSM module 2, keyboard 3, mini printer 4, LCD display 5 (mini display for data indication), micro controller 6 (PIC16F87X) and quartz oscillator 7, which are connected so that micro controller 6 receives through its interface RS 232 data from the input modules, keyboard 3 and GSM module 2, processes them and forwards the necessary information also through the RS 232 port to the output devices LCD display 5, printer 4 and GSM module 2 connected to the center for additional crediting of the mobile operator cards through antenna 8 and the GSM network.

The very procedure of additional crediting of SIM cards represents the application of the unit and, according to the present invention, develops through the procedure shown schematically in Fig 2. in the following way:

- Authorized operator 9 comes with unit 11 for additional crediting of SIM cards to mobile telephone owner 10:
- Upon agreement on the amount of the additional crediting, using keyboard 3, operator 9 enters the number of the mobile telephone the card of which is to be credited;
- Corresponding information goes to GSM module 2 via controller 6, and then through antenna 8 and GSM network 13 it is forwarded to operational center 14 of the mobile telephony;
- After confirmation by authorized operator 9 that the procedure of authorization and payment has been properly performed, operator in center 14 effects the additional crediting of the SIM card by the specified amount;
- Upon additional crediting of the SIM card, operator from center 14 provides operator 9 and owner 10 with the information on successful completion of the additional crediting procedure and the new state of the amount on the SIM card, through GSM network 13, antenna 8, micro controller 6 and LCD display 5 so that they can see and check it;

- After the additional crediting procedure is completed, the mobile telephone owner is given an invoice containing information on the effected additional crediting, printed on printer 4.

METHOD OF INDUSTRIAL OR OTHER APPLICATION OF THE INVENTION

Industrial manufacture of the present invention is absolutely possible in factories for manufacture of electronic devices, and even in well-equipped specialized electronics workshops, all in accordance with the workshop documentation, which can be prepared by experts in the subject area using the description and drawing from this application.

The invention is suitable for series production and, according to the author's opinion, its application is particularly recommended for additional crediting of mobile telephone cards the owners of which are not able to do so without a mediator.

PATENT CLAIMS

1. Transmission unit and its application for additional crediting of SIM cards for mobile telephones, DESIGNATED BY that it is composed of communications ship (1), GSM module (2), keyboard (3), mini printer 4, LCD display (5), micro controller (6), and 20MHz oscillator, design connected so that they allow the procedure of additional crediting of SIM cards for mobile telephones to be performed.

2. Transmission unit and its application for additional crediting of SIM cards for mobile telephones, according to claim 1, DESIGNATED BY that the application of the unit is performed through the following procedure:

Authorized operator 9 comes with unit 11 for additional crediting of SIM cards to mobile telephone owner 10:

- Upon agreement on the amount of the additional crediting, using keyboard 3, operator 9 enters the number of the mobile telephone the card of which is to be credited;
- Corresponding information goes to GSM module 2 via controller 6, and then through antenna 8 and GSM network 13 it is forwarded to operational center 14 of the mobile telephony;
- After confirmation by authorized operator 9 that the procedure of authorization and payment has been properly performed, operator in center 14 effects the additional crediting of the SIM card by the specified amount;
- Upon additional crediting of the SIM card, operator from center 14 provides operator 9 and owner 10 with the information on successful completion of the additional crediting procedure and the new state of the amount on the SIM card, through GSM network 13, antenna 8, micro controller 6, and LCD display 5 so that they can see and check it;
- After the additional crediting procedure is completed, the mobile telephone owner is given an invoice containing information on the effected additional crediting, printed on printer 4.

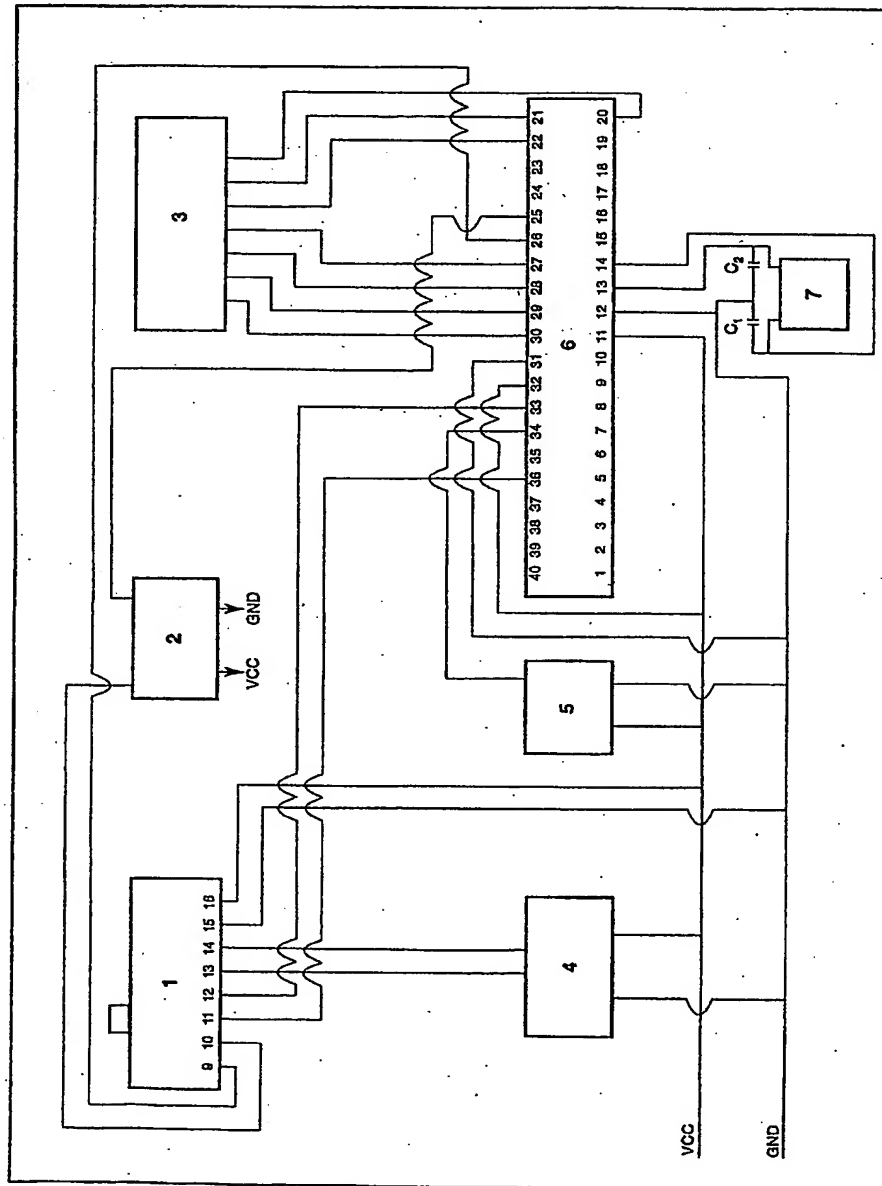


Fig. 1

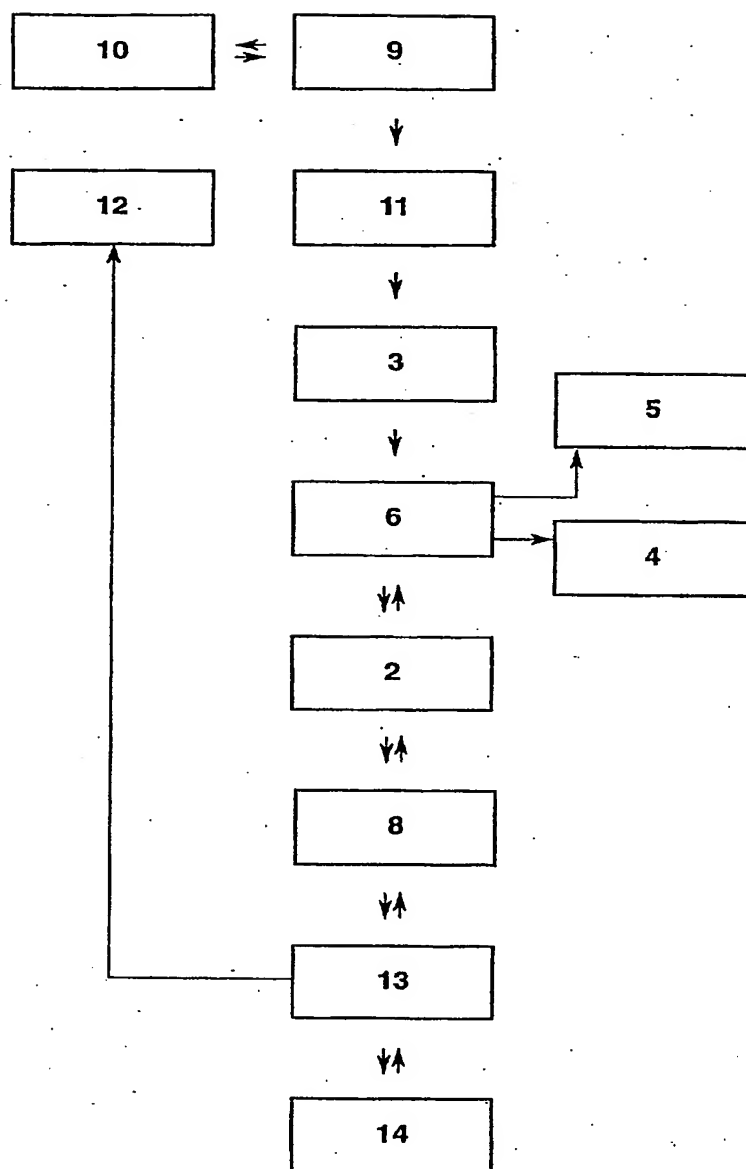


Fig. 2

INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07F7/02 H04M17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G07F H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01 75816 A (SWISSCOM MOBILE) 11 October 2001 (2001-10-11) abstract; claims; figures page 6, line 16 -page 8, line 30 ---	1,2
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/YU 02/00008

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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